Contribution ID: **16** Type: **not specified**

Natural job drainage and power reduction in PIC Tier-1 using HTCondor

Wednesday 11 December 2024 16:15 (15 minutes)

This study presents preliminary analyses of natural job drainage and power reduction patterns in the PIC Tier-1 data center, which uses HTCondor for workload scheduling. By examining historical HTCondor logs, we simulate natural job drainage behaviors, in order to understand natural job drainage patterns: when jobs naturally conclude without external intervention. These findings provide insights into the center's capability to modulate resource usage according to external factors like green energy availability cycles.

To further validate and extend these observations, simulations were conducted under various load conditions to evaluate the influence of job types and VO-specific durations on drainage cycles. An analysis of power consumption pre- and post-drainage, facilitated by ipmitool, allows for estimating potential power and carbon emission reductions in drainage scenarios. Building on these insights, machine learning models are being developed to predict optimal power scaling adjustments.

We propose a conceptual feedback loop to HTCondor that could enable real-time power adjustments based on fluctuations in green energy availability. By exploring these ideas, this research aims to contribute to a more sustainable data center model, offering a framework for adapting workload management to dynamic environmental factors.

Author: FLIX MOLINA, Jose (CIEMAT - Centro de Investigaciones Energéticas Medioambientales y Tec. (ES))

Co-authors: ACOSTA SILVA, Carles (PIC); MERINO, Gonzalo (IFAE - Institute for High Energy Physics); CASALS HERNANDEZ, Jordi (Port d'Informació Científica (PIC)); FABREGA, Kevin (UAB)

Presenter: FLIX MOLINA, Jose (CIEMAT - Centro de Investigaciones Energéticas Medioambientales y Tec. (ES))

Session Classification: Infrastructure

Track Classification: All contributions